

Quiz 11, Math 246, Professor David Levermore
Tuesday, 1 May 2018

Your Name:

Discussion Instructor (circle one):	Kilian Cooley	Corry Bedwell	Thien Ngo
Discussion Time (circle one):	8:00	9:00	10:00
			11:00

No books, notes, calculators, or any electronic devices.

Show your reasoning for full credit. Good luck!

- (1) [5] The eigenpairs of a 2×2 matrix $\mathbf{A}$ are

$$\left(1, \begin{pmatrix} 1 \\ 2 \end{pmatrix}\right), \quad \left(3, \begin{pmatrix} 2 \\ -1 \end{pmatrix}\right).$$

- (a) [2] Classify the phase-plane portrait of the system $\mathbf{x}' = \mathbf{A}\mathbf{x}$.
- (b) [2] Sketch the phase-plane portrait of the system $\mathbf{x}' = \mathbf{A}\mathbf{x}$.
- (c) [1] Determine the stability of the origin for the system $\mathbf{x}' = \mathbf{A}\mathbf{x}$.

- (2) [5] Consider the planar system

$$\mathbf{x}' = \mathbf{B}\mathbf{x}, \quad \text{where } \mathbf{B} = \begin{pmatrix} -3 & 4 \\ -2 & 1 \end{pmatrix}.$$

- (a) [2] Classify its phase-plane portrait.
- (b) [2] Sketch its phase-plane portrait.
- (c) [1] Determine the stability of the origin for this system.